PAPER ID-310233

Roll No: | | | | | | | | | | | | |

BTECH
(SEM VII) THEORY EXAMINATION 2024-25
BLOCKCHAIN ARCHITECTURE DESIGN

TIME: 3 HRS   **M.MARKS: 100**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

Q no.	Question	CO	Level
a.	Define cryptographic hashing.	1	K_1, K_2
b.	Differentiate between hashchains and blockchains.	1	K_1, K_2
c.	What are the design goals of consensus protocols in permissioned blockchains?	2	K_2, K_3
d.	How do permissioned blockchains differ from permissionless ones in terms of consensus mechanisms?	2	K_2, K_3
e.	What are the steps involved in designing and implementing chaincode in Hyperledger Fabric	3	K_3, K_4
f.	How does endorsement policy determine the validity of transactions?	3	K_3, K_4
g.	Explain the use of blockchain in the insurance industry.	4	K_4, K_5
h.	How can blockchain enhance the efficiency and security of the KYC process in financial systems?	4	K_4, K_5
i.	Discuss the benefits of using blockchain for intergovernmental record-keeping.	4	K_4, K_5
j.	Evaluate the security vulnerabilities in blockchain-based digital identity systems.	4	K_4, K_5

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 20**

Q no.	Question	CO	Level
a.	How does the concept of distributed ledgers differ from traditional centralized databases? Discuss with examples how this paradigm shift impacts data integrity and accessibility.	1	K_1, K_2
b.	Analyze how Proof of Elapsed Time (PoET) works as a consensus mechanism. How does it compare to traditional mechanisms like PoW?	2	K_2, K_3
c.	Explain the decomposition of the consensus process in Hyperledger Fabric. How does this approach enhance modularity and scalability?	3	K_3, K_4
d.	Discuss the application of blockchain in financial software for settlements. How does it address challenges such as counterparty risk and transaction reconciliation?	4	K_4, K_5
e.	What are the implications of quantum computing on blockchain cryptography? Discuss the need for quantum-resistant algorithms in government blockchain systems.	4	K_4, K_5

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SECTION C

3.   Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Compare and contrast public and private blockchains in terms of architecture, permissions, and use cases.	1	K_1, K_2
b.	Discuss how privacy is maintained in blockchain systems while ensuring transparency. Provide examples of privacy-preserving techniques used in blockchain.	1	K_1, K_2

4.   Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Discuss the scalability limitations of blockchain consensus protocols. What innovations or techniques have been proposed to address these limitations?	2	K_2, K_3
b.	What are the fundamental requirements for achieving consensus in a blockchain network? Discuss how these requirements ensure the network's security and reliability.	2	K_2, K_3

5.   Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Analyze the security features of Hyperledger Fabric. How does its architecture ensure data confidentiality and integrity in permissioned networks?	3	K_3, K_4
b.	Discuss the role of the Fabric SDK in blockchain application development. How does it simplify interactions with the blockchain network?	3	K_3, K_4

6.   Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	How can blockchain-based solutions improve cross-border trade efficiency? Discuss the technical and regulatory challenges involved.	4	K_4, K_5
b.	Compare the traditional and blockchain-based approaches to supply chain management. Highlight the benefits and limitations of blockchain.	4	K_4, K_5

7.   Attempt any *one* part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Discuss the role of blockchain in public distribution systems and social welfare programs. How can it improve efficiency and reduce fraud?	4	K_4, K_5
b.	How can blockchain be used to create secure and tamper-proof digital identity systems for government applications? Discuss its advantages over traditional systems.	4	K_4, K_5